Basic Life Safety Code Course
Student Manual

Module 4, Lesson 14 Automatic Sprinkler Systems

Performance Objectives

At the conclusion of this lesson, you will be able to:

- Identify key system components of a complete automatic sprinkler system.
- Identify sprinkler types.
- Identify coverage/obstructions.
- Identify system types (dry/wet).
- Identify a system's water supply source.
- Determine whether a sprinkler system is adequately monitored by the fire alarm system.
- Determine whether facility inspection and testing reports comply with NFPA 25.
- Complete K-56 through K-63, and K-154.

Requirements from LSC

Healthcare facilities, except those of Type I (443), I (332), or II (222), must be completely sprinkler protected. Main sprinkler valves must be electrically supervised and must be electrically connected with the fire alarm. In new installations, water flow detection must be provided.

Requirements for Automatic Sprinkler Systems

NFPA 13 requires all areas of a newly constructed building must be protected with automatic sprinkler systems

In accordance with NFPA 13, *Installation of Automatic Sprinkler Systems*, all areas of a newly constructed building are required to be protected with automatic sprinkler systems, including:

- Combustible attic areas.
- Concealed spaces enclosed wholly or partly by exposed combustible construction.
- Vertical shafts that are not noncombustible.
- Limited combustible, nonaccessible duct, electrical, or mechanical shafts.

Protection is also required:

- Beneath all combustible constructed stairways.
- At the top of a shaft.
- Under the first landing above the bottom of the shaft in noncombustible stair shafts.
- In building service chutes.
- In elevator hoist ways.
- In machine rooms.
- In electrical equipment rooms that do not meet the exceptions as noted in NFPA 13.

Sprinklers in Walk-In Coolers and Freezers

Sprinkler heads are required in walk-in coolers and freezers. However, if a walk-in cooler or freezer does not have sprinkler heads and the facility does not obtain a waiver, the facility receives eight points towards its FSES calculation for that room (instead of the normal 10 points). The room still meets equivalency as long as the FSES value of the location remains at zero or greater.

In order for a facility to obtain a waiver to not have sprinkler heads in a walk-in cooler or freezer, the room must be less than 60 square feet and must not have a combustible load. If the room is greater than 60

square feet, it must have a line of two to three sprinkler heads outside the doorway in order to serve as a water curtain.

If mobile/transportable freezers are stored in sprinklered locations, the freezers themselves do not require sprinkler heads and no waiver is required.

Sprinklers

NFPA 13, Section 4-1.1, states that a building with sprinklers installed throughout is considered fully sprinklered. CMS policy classifies freestanding wardrobes as furniture and does not require them to be sprinklered. However, closets and wardrobes that are permanently affixed to the wall must be protected by sprinklers; the sprinkler heads need not necessarily be inside the closet. It is also a good idea to take off the top of the wardrobes and to replace closet doors with louvered or screen doors. Two or three sprinkler heads should be provided outside the closet as a water curtain. In your survey, you should determine whether the closet/wardrobe has a small enough fuel load that a fully developed fire that cannot be controlled by the heads outside the closet/wardrobe is unlikely to occur. You should use the Fire Safety Evaluation System (FSES) for sprinklers, corridors, and habitable spaces.

Major Components of a Sprinkler System

Figure 4.14-1 indicates and identifies the major components of an automatic sprinkler system.

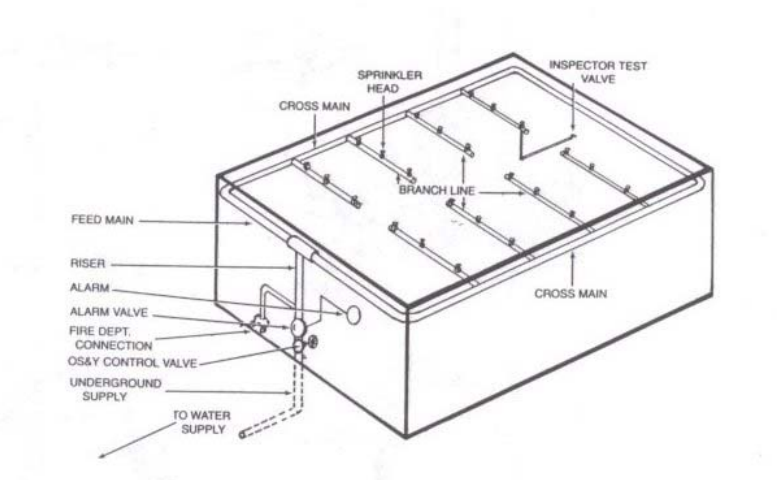


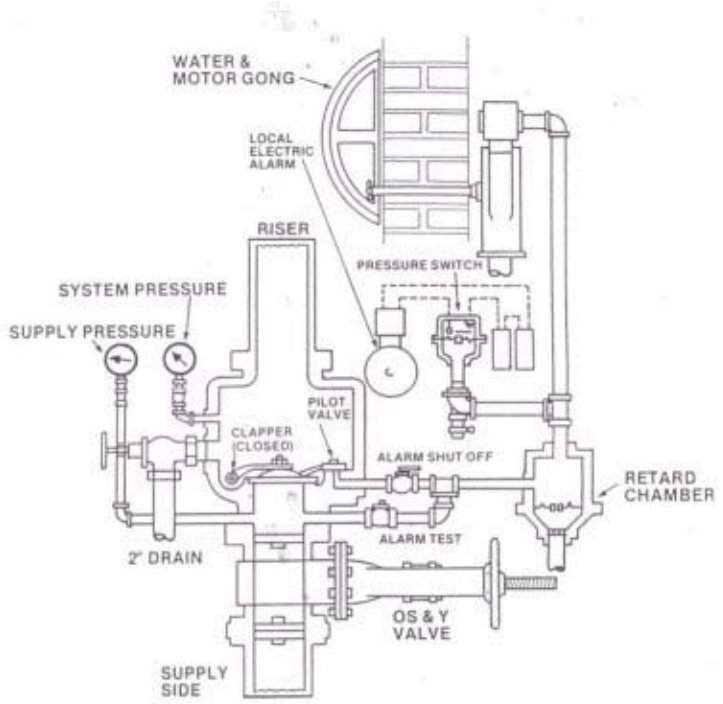
Figure 4.14-1. Major Sprinkler System Components

There are several types of automatic sprinkler systems, but we will address only the wet and dry systems that are most commonly installed in healthcare occupancies.

Wet systems use closed automatic sprinkler heads attached to a piping system with water under constant pressure

Wet Systems

Wet systems use closed automatic sprinkler heads attached to a piping system containing water under constant pressure. Such systems can be installed in areas where there is no danger of water freezing in the piping. Figure 4.14-2 identifies the components of a wet system, which consists of an alarm valve, two pressure gauges, a water flow alarm, a water control valve, and an inspector's test valve that is required on the system side of the water flow switch. When you are inspecting this type of system, the water control valve must be fully open. Each of the two water pressure gauges should indicate a pressure reading suitable for an operational system.



WET PIPE SPRINKLER CONTROL VALVE
(STANDBY POSITION)

Figure 4.14-2

Dry systems use closed automatic sprinklers attached to a piping system with air under pressure

Dry Systems

Dry systems employ closed automatic sprinklers attached to a piping system containing air under pressure. When a fire occurs and the automatic sprinklers activate, the air pressure in the piping escapes. This reduces the pressure in the system; the pressure on the water supply side causes the alarm valve to operate, allowing water to flow through the system piping. Dry systems are used only in areas that cannot be heated to prevent freezing conditions. In healthcare occupancies, it is common to have dry systems protecting unheated attics and combustible concealed spaces. Figure 4.14-3 identifies the components of a dry system, which consists of an alarm valve, air and water pressure gauges, an air compressor or other air pressure source attached to the air source piping, a water flow alarm, a water control valve, and an inspector's test valve, which is placed at the most remote location in the system from the alarm valve.

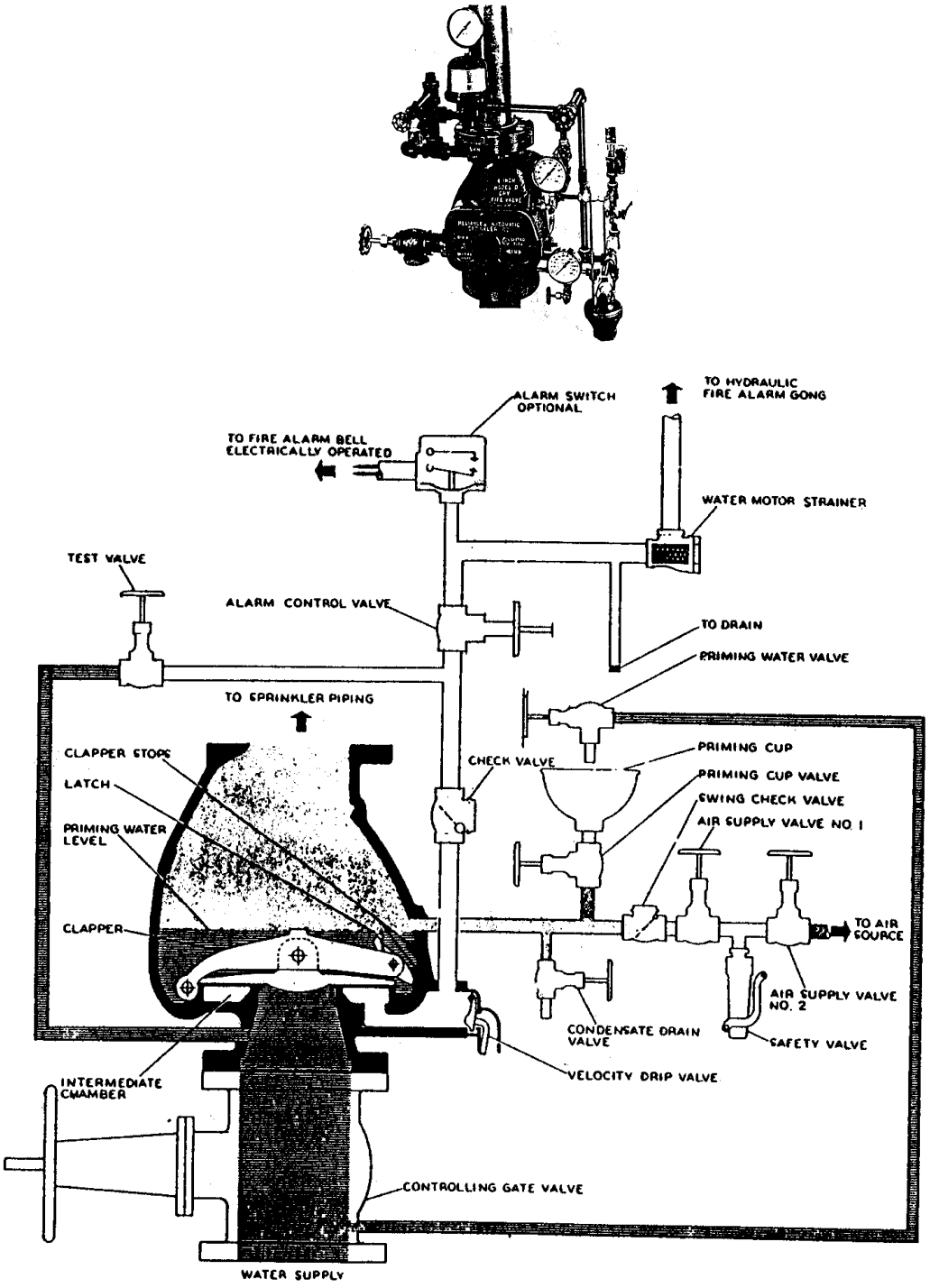


Figure 4.14-3. Differential Dry Pipe Valve

Sprinklers installed on dry systems must be mounted in the upright position only; dry-barrel sprinkler heads are the only pendent mounted sprinklers that can be used with dry-pipe systems. Refer to Figure 4.14-4 for sprinkler head mounting positions and Figure 4.14-5 for sprinkler types.

When you are inspecting this type of system, verify that the water control valve is fully open. The air pressure gauges will always have a lower pressure reading than the water pressure gauge. The water pressure gauge must indicate a pressure reading appropriate for an operational system.

Types of Sprinklers and Their Applications

When you are conducting an inspection of a sprinkler system, it is important to look for sprinklers that have been installed in an incorrect mounting position. This means, of course, that you must be familiar with the most common types of sprinklers you are likely to encounter and the requirements for the mounting of each type.

- Upright-mounted
- Pendent-mounted
- Sidewall-mounted
- Standard spray
- Extended coverage
- Residential
- Quick response
- Dry-barrel
- Ceiling-mounted

Upright-Mounted Sprinklers

Upright-mounted heads are attached from the top of the sprinkler piping (see Figure 4.14-4). Upright deflectors usually have a bent shape around the edges. Upright sprinklers have the letters SSU stamped on the deflector surface.

Pendent-Mounted Sprinklers

Pendent-mounted sprinklers are attached to the bottom of the sprinkler piping (see Figure 4.14-4). The deflector for a pendent sprinkler is usually flat around the edges. Pendent sprinklers have the letters SSP stamped on the deflector surface.

Sidewall-Mounted Sprinklers

Sidewall-mounted sprinklers can be found in either the upright or the horizontal position (see Figure 4.14-4). The upright-mounting deflector is of the older design. The newer design is the horizontal sidewall type that is mounted on the sidewall, usually within 4 to 12 inches of the ceiling.

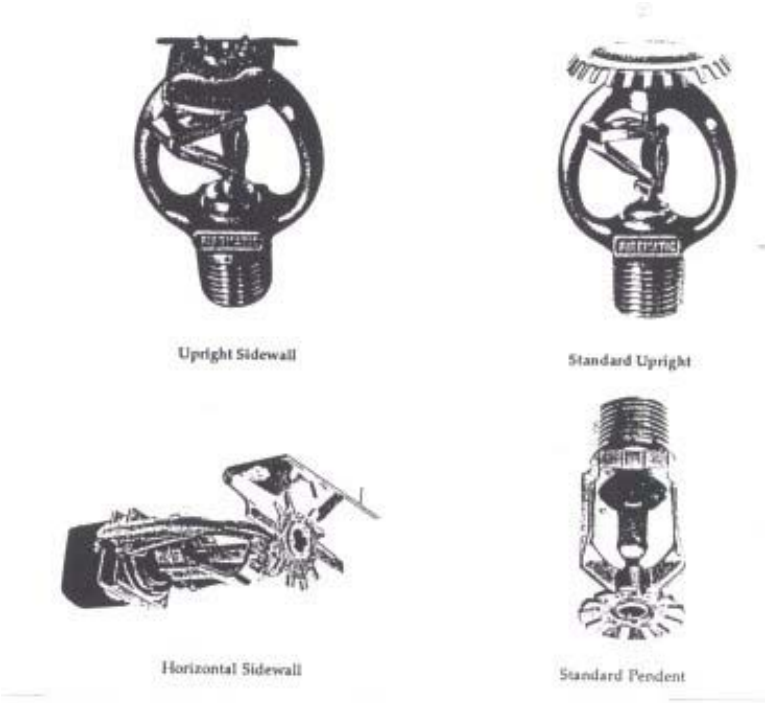


Figure 4.14-4

Standard Spray Sprinklers
A standard spray sprinkler has a water spray pattern that provides fire control for a wide range of fire hazards. It sprays a specific pattern and quantity of water over a designated area. This type of sprinkler has been the standard since 1956.

Extended-Coverage Sprinklers
Extended-coverage sprinklers have special extended directional discharge patterns. They are specially designed and must be installed in accordance with the manufacturer's listed pressures and water supply requirements. This type of sprinkler has the letters EC stamped on the deflector. Extended-coverage heads provide more coverage with fewer sprinklers. For example, one extended-coverage sprinkler mounted as a horizontal sidewall can provide coverage for an 18×20-foot patient room as long as higher pressures are provided at the sprinkler.

Residential Sprinklers
Residential sprinklers are intended for use in residential applications and now are permissible in healthcare occupancies. These sprinklers respond much more quickly to fire than the standard type of sprinkler. They typically use less pressure and water flow and are designed for fire conditions in residential

settings. Their rapid response time provides improved life safety protection.

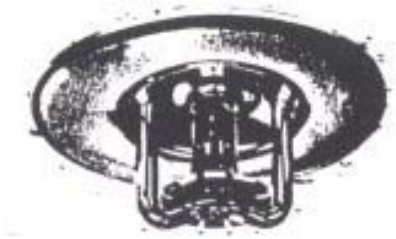
Quick-Response Sprinklers
Quick-response sprinklers have a faster operating time than the standard and, like the residential, provide improved life safety protection. They can attack a fire before it develops high-velocity plumes. Quick-response sprinklers can now be used in healthcare occupancies.

Dry-Barrel Sprinklers
Dry-barrel sprinklers typically have extended pipe lengths (barrels) that are kept dry with a seal where the barrel is attached to the sprinkler piping. The seal is held in place by internal linkage. When the sprinkler fuses, the linkage is released, and this causes the seal to drop out, allowing water to discharge from the sprinkler. This type of sprinkler can be found in the pendent or sidewall position. It can be attached to a wet system to protect a large freezer area or room or other unheated areas. In healthcare occupancies, this type of sprinkler can be found protecting the patient rooms located directly below the attic ceiling. The sprinklers are attached to the dry system in the attic, and because they are of the dry-barrel type, they can be mounted in the pendent position from the dry system above the ceiling.

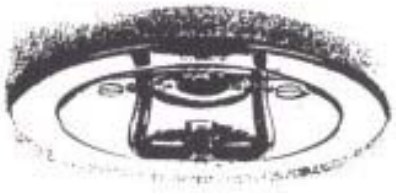
Figure 4.14-5. Automatic Sprinkler Types

Ceiling-Mounted Sprinklers
Ceiling-mounted pendent sprinklers are mounted flush and improve the appearance of the ceiling. Such sprinklers are now manufactured as ornamental, painted, flush, recessed, and

concealed mounted sprinklers (see Figure 4.14-6). These low-profile designs provide appeal and do not project from the ceiling.



Recessed Sprinkler



Flush Type Ceiling Sprinkler

Figure 4.14-6

Temperature Ratings of Sprinklers

The temperature rating of sprinklers is indicated by color-coding on the sprinkler frame or a dot on the top of the deflector. For liquid-bulb types, the color of the liquid will indicate the rating of the sprinkler. For healthcare occupancies, ordinary temperature-rated sprinklers will be used. The exception is in attic areas or other places where the maximum ceiling temperatures exceed 100° F. Ordinary sprinklers rated at 135–170° F have uncolored frames, and the glass bulb color is orange or red. Sprinklers with this rating are used in areas with a maximum ceiling temperature of 100° F. Intermediate heads rated at 175–225° F have white frames or yellow or green glass bulbs.

When inspecting a healthcare occupancy, you must ensure the proper types of sprinklers are being used

Sprinkler Head Installation Requirements and Obstruction Considerations

During the inspection of a healthcare occupancy, it is important to ensure that the proper types of sprinklers are being used. The sprinklers must provide ample coverage with no obstructions that would affect the sprinkler discharge patterns.

Use of Residential or Quick-Response Sprinklers

New Installation

The LSC requires that for sprinkler systems installed in healthcare occupancies, quick-response or residential sprinkler heads must be used throughout smoke compartments containing patient sleeping rooms.

Existing Installations

Standard sprinkler heads may be used in existing occupancies. However, if an existing occupancy is renovated and the alterations affect the existing sprinkler system, replacing the heads with quick-response or residential sprinklers should be considered.

In existing occupancies, when standard sprinklers are replaced with quick-response or residential sprinklers, if there are any patient sleeping rooms in the same smoke compartment as the area where the sprinklers were replaced, the sprinklers in those patient rooms must be replaced as well.

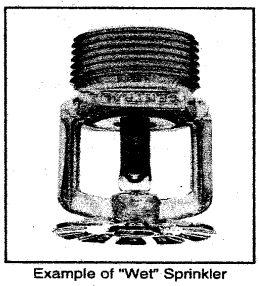
The Consumer Product Safety Commission has issued a voluntary recall of 35 million fire sprinklers produced by the Central Sprinkler Company with O-rings that may leak or under certain conditions may fail to activate in a fire (see Figure 4.14-7). Also included in the recall are a number of fire sprinklers manufactured by Gem Sprinkler Co. and Star Sprinkler Inc.

IMPORTANT SAFETY NOTICE

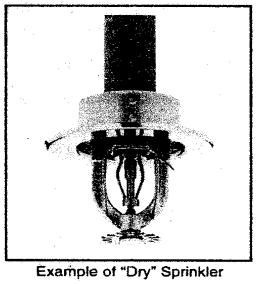
For Home Owners and Building Owners

Central Sprinkler to Replace 35 Million O-Ring Fire Sprinklers

Central Sprinkler Company, an affiliate of Tyco Fire Products LP of Lansdale, PA, and the U.S. Consumer Product Safety Commission (CPSC) are announcing a voluntary recall to replace approximately 35 million Central fire sprinklers with O-ring seals. A limited number of O-ring models sold by Gem Sprinkler Co. and Star Sprinkler, Inc., totaling about 167,000 sprinkler heads, are also included. ***Under certain circumstances, these sprinklers may fail to activate in a fire.*** These sprinklers were installed in a wide variety of buildings, including houses, apartments, hospitals, day care facilities, schools, dormitories, nursing homes, supermarkets, hotels, parking garages, warehouses and office buildings.



Example of "Wet" Sprinkler



Example of "Dry" Sprinkler

OBTAINING REPLACEMENTS

Central will provide free of charge replacement sprinkler heads and the labor needed to replace the sprinklers. The program will be phased in over time in an orderly process that best serves the public interest.

For Help Identifying Your Sprinklers and to Obtain Your Complete Notice Packet, Please Call:

1-800-871-3492

(24 hours a day, 7 days a week)

or visit www.sprinklerreplacement.com

Figure 4.14-7

Area Coverage (General) for Light-Hazard Occupancies

In light-hazard occupancies, the maximum area coverage for a single sprinkler is 225 square feet, with a 15-foot maximum permissible spacing between sprinklers. The maximum permissible spacing between sprinklers and walls is 7½ feet. Each sprinkler must be located a minimum of 4 inches from the nearest wall. The minimum permissible distance between sprinklers in the same room is 6 feet.

Area Coverage (General) for Sidewall Sprinklers in Light-Hazard Occupancies

In light-hazard occupancies, the maximum permissible spacing distance along a wall for sidewall sprinklers is 14 feet. The maximum permissible width of a room in which sidewall sprinklers are used is 14 feet, and the maximum protection area is 196 square feet.

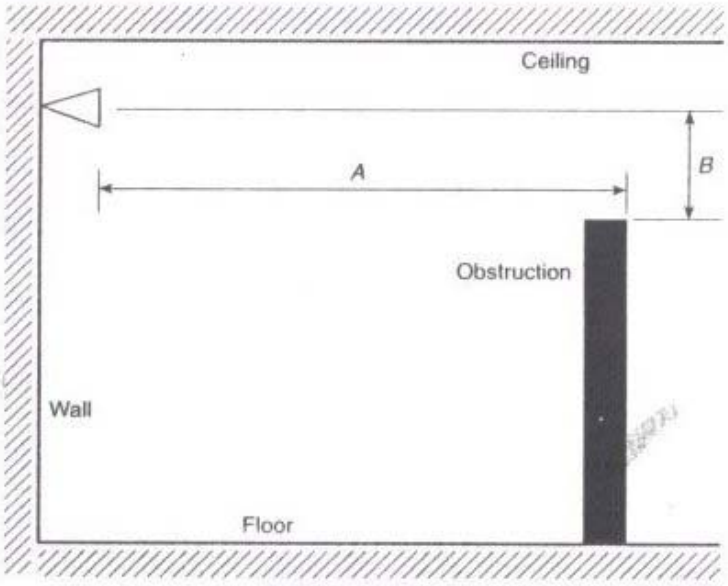
Area Coverage (General) for Extended-Coverage Upright and Pendent-Type Sprinklers in Light-Hazard Occupancies

The maximum permissible coverage area for upright and pendent-type sprinklers in light-hazard occupancies is 256–400 square feet, with a maximum spacing between sprinklers of 16–20 feet. The maximum distance allowed between sprinklers of these types and the nearest wall is one-half of the maximum allowable distance between sprinklers (i.e., 8–10 feet). Sprinklers of these types must be located at least 4 inches from the nearest wall. The minimum permissible distance between sprinklers is 8 feet.

Obstructions Affecting Water Pattern Discharge

The required amount of clearance between sprinkler deflectors and storage in a horizontal plane from deflectors is 18 inches, except for storage along walls. Sprinklers must be installed under all fixed obstructions (such as air ducts and deck flooring) that are more than 4 feet wide. Requirements concerning suspended or floor-mounted obstructions (such as cubicle contains) are as specified in NFPA 13 (see Figure 4.14-8 and Figure 4.14-9).

Figure 5-7.5.2.3 Suspended or floor-mounted obstructions (standard sidewall spray sprinklers).



Elevation View

Table 5-7.5.2.3 Suspended or Floor-Mounted Obstructions (Standard Sidewall Spray Sprinklers)

Horizontal Distance (A)	Minimum Vertical Distance below Deflector (in.) (B)
6 in. or less	3
More than 6 in. to 9 in.	4
More than 9 in. to 12 in.	6
More than 12 in. to 15 in.	8
More than 15 in. to 18 in.	$9^1/_2$
More than 18 in. to 24 in.	$12^1/_2$
More than 24 in. to 30 in.	$15^1/_2$
More than 30 in.	18

For SI units, 1 in. = 25.4 mm.
Note: For (A) and (B), refer to Figure 5-7.5.2.3.

Figure 4.14-8

Table 5-6.5.1.2 Positioning of Sprinklers to Avoid Obstructions to Discharge (SSU/SSP)

Distance from Sprinklers to Side of Obstruction (A)	Maximum Allowable Distance of Deflector above Bottom of Obstruction (in.) (B)
Less than 1 ft	0
One ft to less than 1 ft 6 in.	$2^1/_2$
1 ft 6 in. to less than 2 ft	$3^1/_2$
2 ft to less than 2 ft 6 in.	$5^1/_2$
2 ft 6 in. to less than 3 ft	$7^1/_2$
3 ft to less than 3 ft 6 in.	$9^1/_2$
3 ft 6 in. to less than 4 ft	12
4 ft to less than 4 ft 6 in.	14
4 ft 6 in. to less than 5 ft	$16^1/_2$
5 ft and greater	18

For SI units, 1 in. = 25.4 mm; 1 ft = 0.3048 m.
Note: For (A) and (B), refer to Figure 5-6.5.1.2(a).

Figure 5-6.5.1.2(a) Positioning of sprinklers to avoid obstructions to discharge (SSU/SSP).

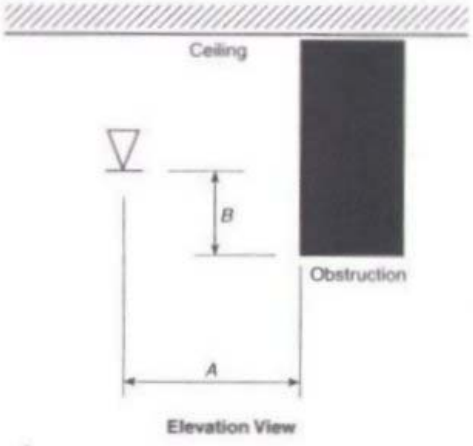


Figure 4.14-9

Water Supply Requirements for Automatic Sprinkler Systems

Every automatic sprinkler system is required to have at least one automatic water supply capable of providing the required flow and pressure for the required duration as specified in NFPA 13. The most common supply source is public water mains. In areas not served by a public water system, other sources can be used, such as an on-site pressure tank that supplies only the sprinkler system. Other supply

sources are gravity tanks, suction tanks with fire pumps, and rivers or lakes with fire pumps. The installation of gravity and suction tanks should meet the requirements of NFPA 22, *Water Tanks for Private Fire Protection*.

Pipe schedule systems have been used for over 75 years; many exist in older healthcare occupancies

Pipe Schedule Systems

Pipe schedule systems have been used for over 75 years. Their design is based on a fixed piping schedule with piping sized in accordance with the type of hazard and number of sprinkler heads supplied by the piping. Many older healthcare occupancies have pipe schedule systems. Beginning in the early 1970s, the basic sprinkler design began changing to hydraulically designed systems. Today, most new systems are hydraulically designed. The owner of any facility you are inspecting should be able to provide information or records on the type of system installed. Hydraulically designed systems *should* have design plates displayed at the sprinkler riser location, as required by NFPA 13 and NFPA 25, *Inspection, Testing, and Maintenance of Water Based Fire Protection Systems*; however, many do not.

Required Water Supply and Pressure for Light-Hazard Occupancies

The required water supply and pressure for light-hazard occupancies is at least 500 gallons per minute (GPM) for a 30- to 60-minute duration with a residual pressure of at least 15 pounds per square inch (PSI) (water in movement) at the highest sprinkler head elevation in the building. In determining the required residual pressure on the water pressure gauges located at the alarm valve, the loss caused by elevation must be added to the residual pressure. For example:

Elevation loss = .433 × the number of feet in height from the alarm valve to the highest sprinkler head. The height to the sprinkler head above the alarm valve is 30 feet × .433 = 12.99 PSI. The minimum required residual pressure would be:

$$\begin{array}{r} 15 \text{ PSI} \\ +\ 12.99 \text{ PSI} \\ \hline = 27.99 \text{ PSI} \end{array}$$

The residual pressure readings can be made only during the main drain flow testing from the alarm valve.

Using the above example, assume the water pressure gauge reads 40 PSI at the alarm valve with no water flowing (static pressure). When the main drain is fully open, the pressure gauge falls to 24 PSI. These readings would indicate that residual pressure of only 11 PSI could be provided at the highest sprinkler head.

A hydraulically designed system is a calculated system in which pipe sizes are based on pressure loss

Hydraulically Designed Systems

A hydraulically designed system is a calculated system in which pipe sizes are based on pressure loss to provide a prescribed water density in gallons per minute per square foot, distributed with a reasonable degree of uniformity over a specific area of design remotely located from the sprinkler system supply sources.

If the hydraulic nameplate for a system has been posted at or near the sprinkler riser as required, you will be able to determine that it is a hydraulically designated system. The nameplate states the calculations for the system; each system requires a separate nameplate with calculation details (see Figure 4.14-10).

This system as shown on .....company

print no. .....dated.....

for .....

at .....contract no.....

is designed to discharge at a rate of .....gpm

(L/min) per sq. ft. of floor area over a maximum area of .....

.....sq. ft. (m^2) when supplied

with water at a rate of .....gpm (L/min)

at .....psi (bars) at the base of the riser.

Hose stream allowance of .....

gpm (L/min) is included in the above.

Nameplate for hydraulically designed sprinkler

Figure 4.14-10

Many hydraulically designed systems do not have such a nameplate; however, this is an enforcement and installation problem. The nameplate provides important information about the required water supply in gallons per minute and the minimum residual pressures required at the riser to supply the system. These numbers are used for comparison to the main drain flow tests that are required annually. For example:

Hydraulic Design Data Requirements:

GPM required = 600
Residual pressure at riser = 45 PSI
Pressure at alarm valve = 55 PSI (static) before test
Pressure reading with main drain open = 40 PSI

Using information on the nameplate, it can be determined that the system has a residual reading of 5 PSI below the minimum required. Obviously, if the nameplate is not available, there is no way to determine that the system is defective.

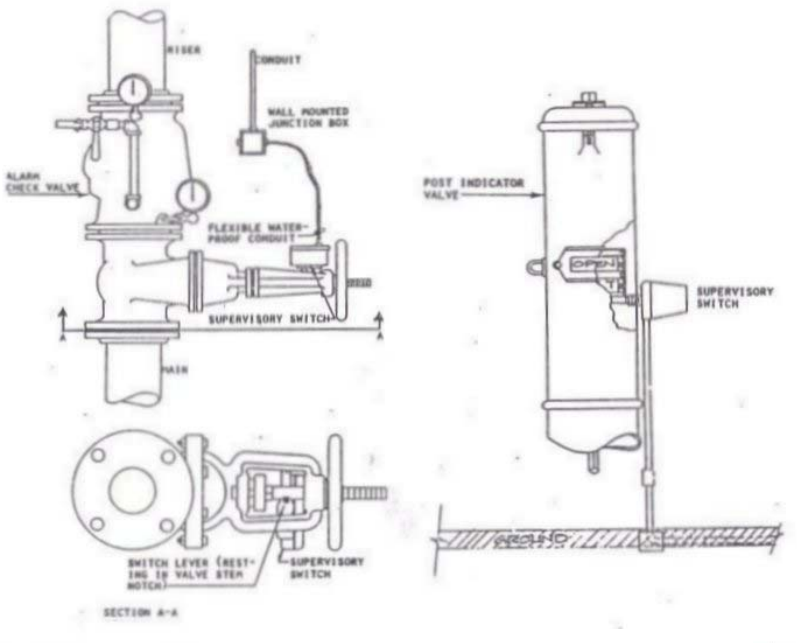
When a sprinkler system is installed in a building with a fire alarm system, the sprinkler system must be supervised through the fire alarm system

Required Supervision of Sprinkler Systems

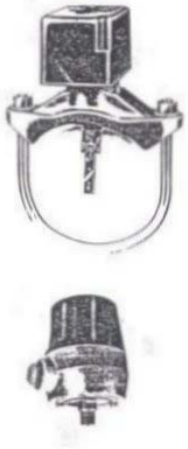
When a sprinkler system is installed in a building with a fire alarm system, the sprinkler system must be supervised through the fire alarm system. The supervised signal provided by the fire alarm must be able to distinguish between trouble signals from the fire alarm system and supervisory signals from the sprinkler system. This distinction is usually indicated by visible indication lights at the fire alarm control panel. The following items are required to be supervised:

- Water control valves (tamper switches).
- If on-site water tank is provided, the water level in the tank and the water tank temperature.
- If on-site pressure tank is provided, the air pressure inside the tank.
- For dry-pipe systems, both high and low air pressure on the dry-pipe system.

In healthcare occupancies, the water flow signal must be able to initiate the building's required fire alarm system and be able to transmit to an approved off-site monitoring facility.



Example of Control Valve Suspension



Example of Water Flow Switches

Figure 4.14-11

Required Sprinkler System Inspection, Testing, and Record Keeping

The LSC requires that the testing and maintenance of sprinkler systems comply with NFPA 25. At a minimum, the following items are required to be inspected:

- Sprinkler heads (deflector damage, painted heads, lint, corrosion of heads).
- Obstruction of sprinkler heads (storage, fixtures, or decorations).
- Piping and fittings (damage and signs of corrosion).
- Pipe hangers (missing or damaged).
- Water and air gauges (in good condition and operational).
- Building (freezing conditions, broken windows, no heat, etc.).
- Hydraulic nameplate (provided for each system that is hydraulically designed).
- Records of sprinkler head retesting. When a system is over 50 years old, a sample of heads should be removed for retesting or the heads should be replaced. For systems employing residential and/or quick-response heads, such sampling and retesting should take place after 20 years rather than 50. For dry-barrel systems, such sampling and retesting should take place every 10 years. The owner of the facility is responsible for maintaining written records of any retesting of existing sprinkler heads.

- Level of antifreeze (for systems that contain antifreeze).
- Supply of spare sprinkler heads (maintained near sprinkler alarm valve in a cabinet) that matches representative samples of installed heads.
- System air compressor (maintained and operational) in dry-pipe systems.
- All water control valves (kept fully open and identified as to what area of the system they control).
- Exterior fire department sprinkler connection (not blocked and maintained in good operational condition) (see Figure 4.14-12).

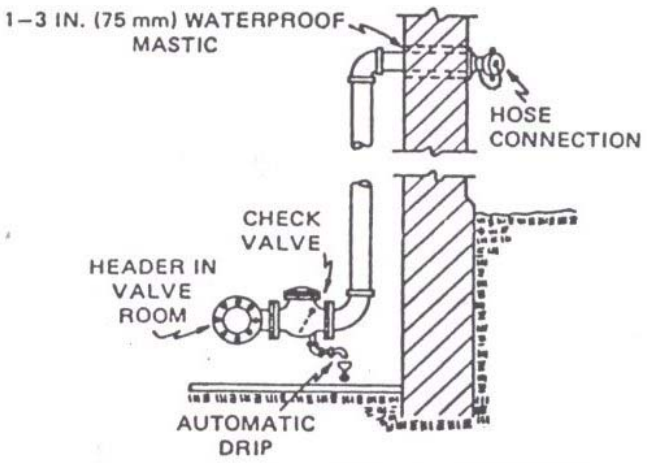
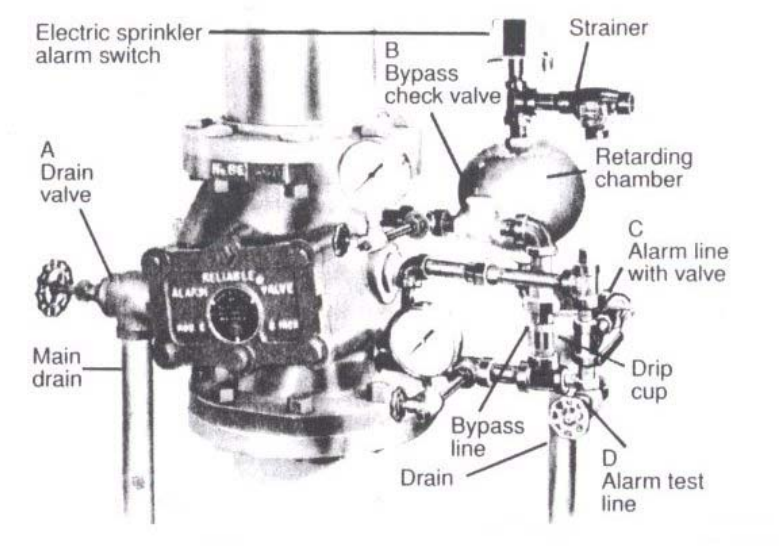


Figure 4.14-12.
Example of Fire Department Sprinkler Connection

Items Required to Be Tested

- Water flow alarms operated by flowing water through inspector test valve or manual alarm test valve must be tested at the alarm valve every six months.
- A main drain test must be conducted annually, and both the static pressure before the test and the residual pressure after the valve has been completely opened must be recorded (see Figure 4.14-13).



Noting Main Drain Location
Figure 4.14-13.

- All water control valves must be exercised annually and tested quarterly.
- All control valves shall be supervised electronically and tested quarterly.
- All valves must be checked, including checking the fire department sprinkler connection, which is internally inspected every five years.
- The dry-pipe system alarm valve must be kept within a heated room or enclosure and checked to ensure that proper air pressure is being maintained on the dry system. This needs to be checked daily by the building representative. Maximum air pressure must be maintained as explained below:

  1 PSI of air pressure for each 6 PSI of water pressure, plus an additional 20 PSI.

  Example:
  Static water pressure = 60 PSI
  Air pressure required = 60 PSI, divided by 6 PSI = 10 PSI
  Plus 20 PSI = 30 PSI maximum.

  A dry-pipe system should not lose more than 7 PSI of air pressure per week. For the example above, the air pressure should be maintained at all times between 20 PSI (low point) and 30 PSI (high point).

- The dry-pipe system alarm valve must be trip-tested annually (partial trip).

- Dry-pipe system valves and piping must be full-flow trip-tested every three years through the remote inspector's test valve. During this test, the following information must be recorded:

  - Water and air pressure at alarm valve.
  - After inspector's test valve is opened:

    - The time in seconds it takes for alarm valve to trip and air pressure on system when tripped.
    - The time in seconds it takes for water to discharge from the inspector's test valve after it has been opened.

  The recorded results will be provided on the inspection form maintained by the owner and on a tag or card attached to the alarm valve.

- The high-air alarm for a dry system, if provided, must be tested quarterly.
- If a system has been provided with an automatic air maintenance device on the air compressor, it must be tested annually for proper operation of the automatic on/off air pressure setting.
- Back-flow devices, if provided, must be located only on the incoming line from the public water system. The following requirements apply to such devices:

  - They must be inspected to ensure control valves are open.
  - They must be tested annually at the designed flow rate for the fire protection system to which the device is attached.
  - Testing and maintenance must be conducted by trained or certified individuals in accordance with the manufacturer's instructions and the policies of the authority having jurisdiction. The owner is required to keep written records of testing and maintenance.

- Obstruction investigation must be conducted to detect pipe scale buildup (rust) for dry-pipe systems. It is not a question of if scale buildup will be present within the dry piping, but how much has accumulated; scale buildup can partially or completely obstruct the piping or sprinkler head discharge. The following must be accomplished:

  - System piping must be internally examined.
  - The system must be flushed if this is necessary to remove scale buildup.

- These obstruction examinations are required:
    - After 15 years of service.
    - After 25 years of service and every 5 years thereafter.

Inspection and Testing Records Required by NFPA 25

Inspection and testing records required by NFPA 25 must indicate procedures performed and must be maintained and retained by the owner until the next test or inspection date and then for one year after that.

The original records for the system must be retained by the owner for the life of the system

The original records for the system (if they exist or can be found), including records of the acceptance test, must be retained by the owner for the life of the system. These records are important to have for both new and existing occupancies and include the following:

- Organization, results, and date of inspection and testing.
- Main drain test results (pressure reading).
- Dry-pipe alarm valve annual trip test.
- Dry-pipe alarm valve full-flow trip test conducted every three years and compared to previous three-year trip test.

Records Review Summary

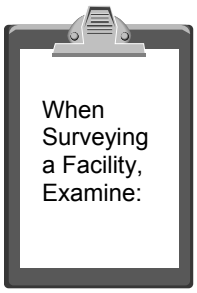
What to look for from the record information:

- The system has been inspected at least annually.
- All water control valves are open.
- Water flow alarms have been operated.
- Sprinkler heads are not obstructed.
- Main drain test results have been recorded and compared to those of the previous drain test. Look for compared residual pressure drops of 10 PSI, or 25% drops between static and residual water pressure readings, or pressure readings below hydraulic-nameplate pressure requirements.
- Dry-pipe alarm valve annual trip test and three-year full trip test have been conducted. Results have been compared to those of the previous three-year trip test.
- Obstruction investigation for dry pipe systems, beginning after 15 years of service, has been conducted.

For older, existing occupancies that have dry systems, if no written records can be provided as to the required internal obstruction investigation, it is critical that the owner be directed to have the obstruction investigation conducted as soon as possible.

NFPA 25 includes sample forms for recording information for various types of fire protection systems. A sample of the four-page form for sprinkler inspections has been provided as Figure 4.14-14.

Surveying for Compliance



In surveying a facility's automatic sprinkler systems for compliance, you should examine all training and inspection reports to ensure that they are up to date and comply with NFPA 25. Verify that sprinkler coverage is adequate and that no obstructions to the coverage exist. Check to be sure that all valves are properly monitored and provided with water flow devices where required. Finally, make sure that hydraulic plates have been provided on all systems that were hydraulically designed.

- All training and inspection reports
- Sprinklers for adequate coverage and no obstructions
- Valves to ensure they are properly monitored
- Hydraulic systems for hydraulic plates

Washington State Fire Marshal
1112 S. Quince ET-32
Olympia, WA 98504

Inland Fire Protection, Inc.
1100 Ahtanum Road
Yakima, WA 98903
(509) 248-4471, fax: (509) 248-1180

Inspection Contract No._____
W.S. & R.B. No._____

RETURN ORIGINAL FOR STATE FIRE MARSHAL

AUTOMATIC SPRINKLER SYSTEM INSPECTION

Name of Facility_____

Building Name or Number_____ Occupancy_____ (Nursing home, hospital, etc.)

Address_____ City_____ Zip_____

Telephone_____ Director / Administrator_____ Conferred with_____

Inspected by_____ Title_____ Date_____

State Registration No. INLANFP161ML

A. Owner's section (to be answered by owner or occupant)

1. Explain any occupancy hazard changes since the previous inspection _____
2. Describe Fire Protection modifications since last inspection_____
3. Describe any fires since last inspection_____
4. When was the system piping last checked for stoppage, corrosion for foreign material?____
5. When was the dry-piping system last checked for proper pitch?_____
6. Are dry valves adequately protected from freezing?_____

B. Inspector's section (all responses reference current inspection)

	YES	NO	N/A
1. General			
a. Is the building occupied?	___	___	___
b. Are all systems in service?	___	___	___
c. Is there a minimum of 18 in. (457 mm) clearance between the top of the storage and the sprinkler deflector?	___	___	___
d. In areas protected by wet system, does the building appear to be properly heated in all areas, including blind attics and perimeter areas where accessible?	___	___	___
e. Does the hand hose on the sprinkler system appear to be satisfactory?	___	___	___
f. Do all exterior openings appear to be protected against freezing?	___	___	___
2. Control Valves (see item 14)			
a. Are all sprinkler system control valves and all other valves in the appropriate open or closed position?	___	___	___
b. Are all control valves in the open positioned locked, sealed or equipped with a tamper switch?	___	___	___

(PAGE 1 OF 4)

Figure 4.14-14

Report No._____

		YES	NO	N/A
3.	**Water Supplies (see item 15)**			
	a. Was a water flow test of main drain made at the sprinkler riser?.....	___	___	___
4.	**Tanks, Pumps Fire Department Connections**			
	a. Are fire pumps, gravity tanks, reservoirs and pressure tanks in good condition and properly maintained?.....	___	___	___
	b. Are fire department connections in satisfactory condition, couplings free, caps in place, and check valves tight?.....	___	___	___
5.	**Wet Systems (see item 13)**			
	a. Are cold weather valves (O.S. & Y.) in the appropriate open or closed position?.....	___	___	___
	b. Have antifreeze system solutions been tested?.....	___	___	___
	c. Were the antifreeze test results satisfactory?.....	___	___	___
6.	**Dry Systems (see items 10 to 14)**			
	a. Is the dry valve in service?.....	___	___	___
	b. Are the air pressure and priming water level in accordance with the Manufacturer's instructions?.....	___	___	___
	c. Has the operation of the air or nitrogen supply been tested?	___	___	___
	Is it in service?.....	___	___	___
	d. Were low points drained during this inspection?.....	___	___	___
	e. Did quick-opening devices operate satisfactorily?.....	___	___	___
	f. Did the dry valve trip properly during the trip pressure test?	___	___	___
	g. Did the heating equipment in the dry-pipe valve room operate at the time of inspection?.....	___	___	___
7.	**Special Systems – As defined in section 1-3 (see item 16)**			
	a. Did the deluge or pre-action valves operate properly during testing?.....	___	___	___
	b. Did the heat-responsive devices operate during testing?...	___	___	___
	c. Did the supervisory devices operate during testing?.....	___	___	___
8.	**Alarms**			
	a. Did water motor and gong test satisfactorily?.....	___	___	___
	b. Did electric alarm test satisfactorily?.....	___	___	___
	c. Did supervisory alarm service test satisfactorily?.....	___	___	___
9.	**Sprinklers**			
	a. Are all sprinklers free from corrosion, loading or obstruction to spray discharge?.....	___	___	___
	b. Are sprinklers over 50 years old, thus requiring sample testing?	___	___	___
	c. Is stock of spare sprinklers available?.....	___	___	___

(PAGE 2 OF 4)

Figure 4.14-14 (cont.)

Report No._____

9. Sprinklers (cont.)	YES	NO	N/A
d. Does the exterior condition of the sprinkler system appear to be satisfactory?.....	___	___	___
e. Temperature. Are sprinklers proper temperature ratings for their locations?.....	___	___	___
10. Date dry-pipe valve trip tested (control valve partially open). (see trip test table which follows.).....	___	___	___
11. Date dry-pipe valve trip tested (control valve fully open). (see trip test table which follows.).....	___	___	___
12. Date quick-opening device tested. (see trip test table which follows.)	___	___	___
13. Date deluge or preaction valve tested. (see trip test table which Follows).....	___	___	___

DRY VALVE

MAKE	MODEL	SERIAL NO.	Q.O.D MAKE	Q.O.D MODEL	Q.O.D SERIAL NO.

DRY PIPE OPERATING TEST

	TIME TO TRIP THRU TEST PIPE		WATER PRESSURE	AIR PRESSURE	TRIP POINT AIR PRESSURE	TIME WATER REACHED TEST OUTLET		ALARM OPERATED PROPERLY	
	MIN.	SEC.	PSI	PSI	PSI	MIN.	SEC.	YES	NO
WITHOUT Q.O.D.									
WITH Q.O.D									

If No Explain

DELUGE & PREACTION VALVES

OPERATION ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC

PIPING SUPERVISED ☐ YES ☐ NO DETECTING MEDIA SUPERVISED ☐ YES ☐ NO

DOES VALVE OPERATE FROM THE MANUAL TRIP AND /OR REMOTE CONTROL STATIONS ☐ YES ☐ NO

IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING ☐ YES ☐ NO IF NO, EXPLAIN

MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM		DOES EACH CIRCUIT OPERATE VALVE RELEASE		MAXIMUM TIME TO OPERATE RELEASE	
		YES	NO	YES	NO	MIN.	SEC.

CONTROL VALVE MAINTENANCE TABLE

14. CONTROL VALVES	NUMBER	TYPE	OPEN	SECURED	CLOSED	SIGNS	CONDITION
CITY CONTROL VALVES							
TANK CONTROL VALVES							
PUMP CONTROL VALVE							
SECTIONAL CONTROL VALVES							
SYSTEM CONTROL VALVES							
OTHER CONTROL VALVES							

15. WATER FLOW TEST AT SPRINKLER RISER

WATER SUPPLY SOURCE	CITY	TANK		PUMP
DATE	TEST PIPE LOCATION	SIZE TEST PIPE	STATIC PRESSURE	RESIDUAL (flow) PRESSURE
LAST WATER FLOW TEST				
THIS WATER FLOW TEST				

(PAGE 3 OF 4)

Figure 4.14-14 (cont.)

Report No._____

16. HEAT RESPONSIVE DEVICES
TEST METHOD_____

TYPE OF EQUIPMENT_____
MANUFACTURER_____

TEST RESULTS:

VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E

AUXILIARY EQUIPMENT: NO._____ TYPE_____ TEST RESULTS_____

17. EXPLAIN ANY "NO" ANSWERS AND COMMENTS._____

18. ADJUSTMENTS OR CORRECTIONS MADE DURING THIS SINSPECTION:_____

19. ALTHOUGH THESE COMENTS ARE NOT THE RESULT OF AN ENGINEERING REVIEW, THE FOLLOWING DESIRABLE IMPROVEMENTS ARE RECOMMENDED:_____

THIS IS TO CERTIFY THAT THIS AUTOMATIC SPRINKLER SYSTEM HAS BEEN INSPETED IN ACCORDANCE WITH THE STANDARDS ADOPTED BY THE WASHINGTON STATE FIRE MARSHAL AND N.F.P.A. STANDARDS 13 AND 13A.

NAME OF FIRM INLAND FIRE PROTECTION, INC.

MAILING ADDRESS 1100 AHTANUM ROAD, YAKIMA, WA 98903

NAME_____ TITLE_____ DATE_____
SIGNATURE OF FIRE OFFICIAL

NAME_____ TITLE_____ DATE_____
SIGNATURE OF OWNER OR REPRESENTATIVE

THIS ORIGINAL FORM SHALL BE RETURNED TO THE STATE FIRE MARSHALS OFFICE
(PAGE 4 OF 4)

Figure 4.14-14 (cont.)

30 minutes
Small-Group Activity

Activity 4.14-1

Automatic Sprinkler Systems

Purpose

This activity is designed to help you review sprinkler inspection reports to determine deficiencies with respect to the requirements of NFPA 13 and 25.

Directions

1. Your instructor will divide the class into small groups.

2. You will review the three reports provided, along with the detailed description of the dry-type sprinkler system, and determine if any deficiencies exist related to the requirements of NFPA 13 and 25.

3. You will have 20 minutes to complete this activity before the classroom discussion of the suggested responses begins.

Activity 4.14-1 (cont.)

Automatic Sprinkler Systems

You have just completed the inspection of the Happy Time Care Home, which has been in existence for 20 years. The home is protected by a dry-type automatic sprinkler system that was installed when the home was constructed.

After you have completed your inspection, you ask the maintenance supervisor for any reports of sprinkler system inspections for the last three years.

Description of the Dry-Type Automatic Sprinkler System for Happy Time Care Home

1. 100% of the home is protected with one dry-type system, supplied from the public water system.

2. The incoming public water line is 6 inches in size, supplying a 4-inch standard dry-alarm valve that is supplying piping with a capacity of 500 gallons with a hydraulic system design.

3. The 4-inch alarm valve is equipped with an accelerator quick-type opening device.

4. The air pressure to the dry valve is provided by an air compressor equipped with an automatic air maintenance device set to come on at a low air pressure of 20 PSI and go off at a high pressure of 30 PSI.

5. The dry alarm valve is equipped with a 2-inch main drain valve. Also provided is a water pressure flow switch and OS&Y tamper switch interconnected into the building fire alarm system.

6. The system is provided with 3 low-point auxiliary-type drain locations.

7. Sprinkler head coverage is 120 square feet per head. Sprinkler heads located in the attic are rated at 212º F and those on the ground floor at 165º F. All heads are of standard type. Heads are mounted in either upright or sidewall positions.

8. A standard fire department connection equipped with two 2½-inch hose connections is provided to the system.

9. Water supply information: The system is a hydraulically designed system. The static water pressure is 60 PSI.

Activity 4.14-1 (cont.)

Automatic Sprinkler Systems

10. The hydraulic-nameplate attached to the 4-inch riser notes the following water supply information:

    - Remote area design = 1950 square feet.
    - Required water supply rate = 375 gallons per minute.
    - Required residual pressure at riser = 40 PSI.
    - Hose stream allowance of 100 gallons per minute is included in the above water supply rate.

11. During your inspection you note the air pressure on the dry valve is 28 PSI and static water pressure is 58 PSI.

Copies of the three inspection reports can be found on Student Manual pages M4L14-32 through M4L14-43.

List deficiencies:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Washington State Fire Marshal
1112 S. Quince ET-32
Olympia, WA 98504

Inland Fire Protection, Inc.
1100 Ahtanum Road
Yakima, WA 98903
(509) 248-4471, fax: (509) 248-1180

Inspection Contract No.
W.S. & R.B. No. 99-348

RETURN ORIGINAL FOR STATE FIRE MARSHAL

AUTOMATIC SPRINKLER SYSTEM INSPECTION

Name of Facility Happy Time Care Home

Building Name or Number MAIN UNIT Occupancy NURSING HOME (Nursing home, hospital, etc.)

Address 103 HAPPY TIME LANE City EDMONDS WA. Zip

Telephone 425-0017 Director / Administrator MR. TIMES Conferred with MR. JACKS MAINT SUPERVISION

Inspected by JOHN JONES Title FIELD Inspector Date OCT. 3, 1999

State Registration No. INLANFP161ML

A. Owner's section (to be answered by owner or occupant)

1. Explain any occupancy hazard changes since the previous inspection NONE
2. Describe Fire Protection modifications since last inspection NONE
3. Describe any fires since last inspection NONE
4. When was the system piping last checked for stoppage, corrosion for foreign material? WHEN INSTALLED OKAY
5. When was the dry-piping system last checked for proper pitch? WHEN INSTALLED
6. Are dry valves adequately protected from freezing? YES

B. Inspector's section (all responses reference current inspection)

	YES	NO	N/A
1. General			
a. Is the building occupied?	✓		
b. Are all systems in service?	✓		
c. Is there a minimum of 18 in. (457 mm) clearance between the top of the storage and the sprinkler deflector?	✓		
d. In areas protected by wet system, does the building appear to be properly heated in all areas, including blind attics and perimeter areas where accessible?			✓
e. Does the hand hose on the sprinkler system appear to be satisfactory?			✓
f. Do all exterior openings appear to be protected against freezing?			✓
2. Control Valves (see item 14)			
a. Are all sprinkler system control valves and all other valves in the appropriate open or closed position?	✓		
b. Are all control valves in the open positioned locked, sealed or equipped with a tamper switch?	✓		

Report No. 99-348

		YES	NO	N/A
3.	**Water Supplies (see item 15)**			
	a. Was a water flow test of main drain made at the sprinkler riser?	✓		
4.	**Tanks, Pumps Fire Department Connections**			
	a. Are fire pumps, gravity tanks, reservoirs and pressure tanks in good condition and properly maintained?			✓
	b. Are fire department connections in satisfactory condition, couplings free, caps in place, and check valves tight?	✓		
5.	**Wet Systems (see item 13)**			
	a. Are cold weather valves (O.S. & Y.) in the appropriate open or closed position?			✓
	b. Have antifreeze system solutions been tested?			✓
	c. Were the antifreeze test results satisfactory?			✓
6.	**Dry Systems (see items 10 to 14)**			
	a. Is the dry valve in service?	✓		
	b. Are the air pressure and priming water level in accordance with the Manufacturer's instructions?	✓		
	c. Has the operation of the air or nitrogen supply been tested?	✓		
	Is it in service?	✓		
	d. Were low points drained during this inspection?	✓		
	e. Did quick-opening devices operate satisfactorily?	✓		
	f. Did the dry valve trip properly during the trip pressure test?	✓		
	g. Did the heating equipment in the dry-pipe valve room operate at the time of inspection?	✓		
7.	**Special Systems – As defined in section 1-3 (see item 16)**			
	a. Did the deluge or pre-action valves operate properly during testing?			✓
	b. Did the heat-responsive devices operate during testing?			✓
	c. Did the supervisory devices operate during testing?			✓
8.	**Alarms**			
	a. Did water motor and gong test satisfactorily?			✓
	b. Did electric alarm test satisfactorily?	✓		
	c. Did supervisory alarm service test satisfactorily?			✓
9.	**Sprinklers**			
	a. Are all sprinklers free from corrosion, loading or obstruction to spray discharge?	✓		
	b. Are sprinklers over 50 years old, thus requiring sample testing?			✓
	c. Is stock of spare sprinklers available?	✓		

(PAGE 2 OF 4)

Report No. 99-348

	YES	NO	N/A
9. Sprinklers (cont.)			
d. Does the exterior condition of the sprinkler system appear to be satisfactory?	✓		
e. Temperature. Are sprinklers proper temperature ratings for their locations?	✓		
10. Date dry-pipe valve trip tested (control valve partially open). (see trip test table which follows.)			✓
11. Date dry-pipe valve trip tested (control valve fully open). (see trip test table which follows.) OCT 3, 1999	✓		
12. Date quick-opening device tested. (see trip test table which follows.)	✓		
13. Date deluge or preaction valve tested. (see trip test table which Follows.)			✓

DRY VALVE

MAKE	MODEL	SERIAL NO.
RELIABLE	4"	

Q.O.D

MAKE	MODEL	SERIAL NO.
RELIABLE	D	

DRY PIPE OPERATING TEST

	TIME TO TRIP THRU TEST PIPE MIN.	TIME TO TRIP THRU TEST PIPE SEC.	WATER PRESSURE PSI	AIR PRESSURE PSI	TRIP POINT AIR PRESSURE PSI	TIME WATER REACHED TEST OUTLET MIN.	TIME WATER REACHED TEST OUTLET SEC.	ALARM OPERATED PROPERLY YES	ALARM OPERATED PROPERLY NO
WITHOUT Q.O.D.									
WITH Q.O.D	15		60	30 PSI	12 PSI		50	✓	

If No Explain

DELUGE & PREACTION VALVES

OPERATION ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC

PIPING SUPERVISED ☐ YES ☐ NO DETECTING MEDIA SUPERVISED ☐ YES ☐ NO

DOES VALVE OPERATE FROM THE MANUAL TRIP AND /OR REMOTE CONTROL STATIONS ☐ YES ☐ NO

IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING ☐ YES ☐ NO IF NO, EXPLAIN

MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM YES	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM NO	DOES EACH CIRCUIT OPERATE VALVE RELEASE YES	DOES EACH CIRCUIT OPERATE VALVE RELEASE NO	MAXIMUM TIME TO OPERATE RELEASE MIN.	MAXIMUM TIME TO OPERATE RELEASE SEC.

CONTROL VALVE MAINTENANCE TABLE

14. CONTROL VALVES	NUMBER	TYPE	OPEN	SECURED	CLOSED	SIGNS	CONDITION
CITY CONTROL VALVES	2	OS&Y	YES	NO	NO	NO	GOOD
TANK CONTROL VALVES							
PUMP CONTROL VALVE							
SECTIONAL CONTROL VALVES	N/A						
SYSTEM CONTROL VALVES	1	OS&Y	YES	YES	NO	YES	GOOD
OTHER CONTROL VALVES	N/A						

15. WATER FLOW TEST AT SPRINKLER RISER

WATER SUPPLY SOURCE CITY 6" MAIN TANK PUMP

DATE OCT 3, 1999 TEST PIPE LOCATION AT RISER SIZE TEST PIPE 2" STATIC PRESSURE 60 RESIDUAL (flow) PRESSURE 50 PSI

LAST WATER FLOW TEST SEPT 13, 1998

THIS WATER FLOW TEST SAME

Report No. 99-348

16. HEAT RESPONSIVE DEVICES
TEST METHOD N/A

TYPE OF EQUIPMENT
MANUFACTURER

TEST RESULTS:

VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E

AUXILIARY EQUIPMENT: NO. TYPE TEST RESULTS

17. EXPLAIN ANY "NO" ANSWERS AND COMMENTS N/A

18. ADJUSTMENTS OR CORRECTIONS MADE DURING THIS SINSPECTION: NONE

19. ALTHOUGH THESE COMENTS ARE NOT THE RESULT OF AN ENGINEERING REVIEW, THE FOLLOWING DESIRABLE IMPROVEMENTS ARE RECOMMENDED: NONE

THIS IS TO CERTIFY THAT THIS AUTOMATIC SPRINKLER SYSTEM HAS BEEN INSPETED IN ACCORDANCE WITH THE STANDARDS ADOPTED BY THE WASHINGTON STATE FIRE MARSHAL AND N.F.P.A. STANDARDS 13 AND ~~13A~~ 25

NAME OF FIRM INLAND FIRE PROTECTION, INC.

MAILING ADDRESS 1100 AHTANUM ROAD, YAKIMA, WA 98903

NAME _____ TITLE _____ DATE _____
SIGNATURE OF FIRE OFFICIAL

NAME John Jacobs TITLE MAINT. SUPERVISOR DATE OCT 3, 1999
SIGNATURE OF OWNER OR REPRESENTATIVE

THIS ORIGINAL FORM SHALL BE RETURNED TO THE STATE FIRE MARSHALS OFFICE
(PAGE 4 OF 4)

Washington State Fire Marshal
1112 S. Quince ET-32
Olympia, WA 98504

Inland Fire Protection, Inc.
1100 Ahtanum Road
Yakima, WA 98903
(509) 248-4471, fax: (509) 248-1180

Inspection Contract No.
W.S. & R.B. No. 2000-407

RETURN ORIGINAL FOR STATE FIRE MARSHAL

AUTOMATIC SPRINKLER SYSTEM INSPECTION

Name of Facility HAPPY TIME CARE HOME

Building Name or Number MAIN UNIT Occupancy NURSING HOME (Nursing home, hospital, etc.)

Address 103 HAPPY TIME LANE City EDMONDS WA. Zip ~~[illegible]~~ ~~MAINT~~ SUPERVISOR

Telephone 425-0017 Director / Administrator MR. TIMES Conferred with MR. JACK MAINT SUPERVISOR

Inspected by John Brooks Title FIELD INSPECTOR Date OCT 13, 2000

State Registration No. INLANFP161ML

A. Owner's section (to be answered by owner or occupant)

1. Explain any occupancy hazard changes since the previous inspection NONE
2. Describe Fire Protection modifications since last inspection NONE
3. Describe any fires since last inspection NONE
4. When was the system piping last checked for stoppage, corrosion for foreign material? OKAY INSTALLED
5. When was the dry-piping system last checked for proper pitch? OKAY INSTALLED
6. Are dry valves adequately protected from freezing? YES

B. Inspector's section (all responses reference current inspection)

		YES	NO	N/A
1.	**General**			
a.	Is the building occupied?	✓	—	—
b.	Are all systems in service?	✓	—	—
c.	Is there a minimum of 18 in. (457 mm) clearance between the top of the storage and the sprinkler deflector?	✓	—	—
d.	In areas protected by wet system, does the building appear to be properly heated in all areas, including blind attics and perimeter areas where accessible?	—	—	✓
e.	Does the hand hose on the sprinkler system appear to be satisfactory?	—	—	✓
f.	Do all exterior openings appear to be protected against freezing?	—	—	✓
2.	**Control Valves (see item 14)**			
a.	Are all sprinkler system control valves and all other valves in the appropriate open or closed position?	✓	—	—
b.	Are all control valves in the open positioned locked, sealed or equipped with a tamper switch?	✓	—	—

Report No. 2000-404

		YES	NO	N/A
3.	**Water Supplies (see item 15)**			
	a. Was a water flow test of main drain made at the sprinkler riser?	✓		
4.	**Tanks, Pumps Fire Department Connections**			
	a. Are fire pumps, gravity tanks, reservoirs and pressure tanks in good condition and properly maintained?			✓
	b. Are fire department connections in satisfactory condition, couplings free, caps in place, and check valves tight?	✓		
5.	**Wet Systems (see item 13)**			
	a. Are cold weather valves (O.S. & Y.) in the appropriate open or closed position?	✓		✓
	b. Have antifreeze system solutions been tested?			✓
	c. Were the antifreeze test results satisfactory?			✓
6.	**Dry Systems (see items 10 to 14)**			
	a. Is the dry valve in service?	✓		
	b. Are the air pressure and priming water level in accordance with the Manufacturer's instructions?	✓		
	c. Has the operation of the air or nitrogen supply been tested?	✓		
	Is it in service?	✓		
	d. Were low points drained during this inspection?	✓		
	e. Did quick-opening devices operate satisfactorily?	✓		
	f. Did the dry valve trip properly during the trip pressure test?	✓		
	g. Did the heating equipment in the dry-pipe valve room operate at the time of inspection?	✓		
7.	**Special Systems – As defined in section 1-3 (see item 16)**			
	a. Did the deluge or pre-action valves operate properly during testing?			✓
	b. Did the heat-responsive devices operate during testing?			✓
	c. Did the supervisory devices operate during testing?			✓
8.	**Alarms**			
	a. Did water motor and gong test satisfactorily?	✓		✓
	b. Did electric alarm test satisfactorily?	✓		
	c. Did supervisory alarm service test satisfactorily?			✓
9.	**Sprinklers**			
	a. Are all sprinklers free from corrosion, loading or obstruction to spray discharge?	✓		
	b. Are sprinklers over 50 years old, thus requiring sample testing?	✓		✓
	c. Is stock of spare sprinklers available?	✓		

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	YES	NO	N/A
9. Sprinklers (cont.)			
d. Does the exterior condition of the sprinkler system appear to be satisfactory?	✓		
e. Temperature. Are sprinklers proper temperature ratings for their locations?	✓		
10. Date dry-pipe valve trip tested (control valve partially open). (see trip test table which follows.) OCT 13, 2000	✓		
11. Date dry-pipe valve trip tested (control valve fully open). (see trip test table which follows.)			✓
12. Date quick-opening device tested. (see trip test table which follows.)	✓		
13. Date deluge or preaction valve tested. (see trip test table which Follows.)			✓

DRY PIPE OPERATING TEST

	DRY VALVE MAKE	DRY VALVE MODEL	DRY VALVE SERIAL NO.	Q.O.D MAKE	Q.O.D MODEL	Q.O.D SERIAL NO.
	RELIABLE	4"		RELIABLE	D	

	TIME TO TRIP THRU TEST PIPE MIN.	TIME TO TRIP THRU TEST PIPE SEC.	WATER PRESSURE PSI	AIR PRESSURE PSI	TRIP POINT AIR PRESSURE PSI	TIME WATER REACHED TEST OUTLET MIN.	TIME WATER REACHED TEST OUTLET SEC.	ALARM OPERATED PROPERLY YES	ALARM OPERATED PROPERLY NO
WITHOUT Q.O.D.									
WITH Q.O.D	13		58	27 PSI	12 PSI	N/A	N/A	✓	

If No Explain

DELUGE & PREACTION VALVES

OPERATION ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC

PIPING SUPERVISED ☐ YES ☐ NO DETECTING MEDIA SUPERVISED ☐ YES ☐ NO

DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS ☐ YES ☐ NO

IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING ☐ YES ☐ NO IF NO, EXPLAIN

MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM YES	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM NO	DOES EACH CIRCUIT OPERATE VALVE RELEASE YES	DOES EACH CIRCUIT OPERATE VALVE RELEASE NO	MAXIMUM TIME TO OPERATE RELEASE MIN.	MAXIMUM TIME TO OPERATE RELEASE SEC.

CONTROL VALVE MAINTENANCE TABLE

14. CONTROL VALVES	NUMBER	TYPE	OPEN	SECURED	CLOSED	SIGNS	CONDITION
CITY CONTROL VALVES	2	OS&Y	YES	NO	NO	NO	GOOD
TANK CONTROL VALVES							
PUMP CONTROL VALVE							
SECTIONAL CONTROL VALVES	N/A						
SYSTEM CONTROL VALVES	1	OS&Y	YES	YES	NO	YES	GOOD
OTHER CONTROL VALVES							

15. WATER FLOW TEST AT SPRINKLER RISER

WATER SUPPLY SOURCE CITY 6" MAIN TANK PUMP

DATE OCT 13, 2000 TEST PIPE LOCATION KITCHEN SIZE TEST PIPE 2" STATIC PRESSURE 58 RESIDUAL (flow) PRESSURE 45 PSI

LAST WATER FLOW TEST OCT 3, 1999

THIS WATER FLOW TEST

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16. HEAT RESPONSIVE DEVICES
TEST METHOD N/A

TYPE OF EQUIPMENT
MANUFACTURER

TEST RESULTS:

VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E

AUXILIARY EQUIPMENT: NO. TYPE TEST RESULTS

17. EXPLAIN ANY "NO" ANSWERS AND COMMENTS. N/A

18. ADJUSTMENTS OR CORRECTIONS MADE DURING THIS SINSPECTION: NONE

19. ALTHOUGH THESE COMENTS ARE NOT THE RESULT OF AN ENGINEERING REVIEW, THE FOLLOWING DESIRABLE IMPROVEMENTS ARE RECOMMENDED: NONE

THIS IS TO CERTIFY THAT THIS AUTOMATIC SPRINKLER SYSTEM HAS BEEN INSPETED IN ACCORDANCE WITH THE STANDARDS ADOPTED BY THE WASHINGTON STATE FIRE MARSHAL AND N.F.P.A. STANDARDS 13 AND 13A.

NAME OF FIRM INLAND FIRE PROTECTION, INC.

MAILING ADDRESS 1100 AHTANUM ROAD, YAKIMA, WA 98903

NAME _____ TITLE _____ DATE _____
SIGNATURE OF FIRE OFFICIAL

NAME John Jenkins TITLE MAINT. SUPERVISOR DATE OCT 13, 2000
SIGNATURE OF OWNER OR REPRESENTATIVE

THIS ORIGINAL FORM SHALL BE RETURNED TO THE STATE FIRE MARSHALS OFFICE
(PAGE 4 OF 4)

Washington State Fire Marshal
1112 S. Quince ET-32
Olympia, WA 98504

Inland Fire Protection, Inc.
1100 Ahtanum Road
Yakima, WA 98903
(509) 248-4471, fax: (509) 248-1180

Inspection Contract No.
W.S. & R.B. No. 2001-3578

RETURN ORIGINAL FOR STATE FIRE MARSHAL

AUTOMATIC SPRINKLER SYSTEM INSPECTION

Name of Facility HAPPY TIME CARE HOME

Building Name or Number MAIN UNIT Occupancy NURSING HOME (Nursing home, hospital, etc.)

Address 103 HAPPY TIME LANE City EDMONDS WA. Zip

Telephone 425-0017 Director / Administrator MR. TIMES Conferred with MR. BLACK MAINTENANCE

Inspected by TOM JACKSON Title INSPECTOR Date OCT 30, 2001

State Registration No. INLANFP161ML

A. Owner's section (to be answered by owner or occupant)

1. Explain any occupancy hazard changes since the previous inspection N/A
2. Describe Fire Protection modifications since last inspection N/A
3. Describe any fires since last inspection NONE
4. When was the system piping last checked for stoppage, corrosion for foreign material? OCT 13, 2000 OKAY
5. When was the dry-piping system last checked for proper pitch? CHECKED OKAY
6. Are dry valves adequately protected from freezing? YES

B. Inspector's section (all responses reference current inspection)

	YES	NO	N/A
1. General			
a. Is the building occupied?	✓		
b. Are all systems in service?	✓		
c. Is there a minimum of 18 in. (457 mm) clearance between the top of the storage and the sprinkler deflector?		✓	
d. In areas protected by wet system, does the building appear to be properly heated in all areas, including blind attics and perimeter areas where accessible?			✓
e. Does the hand hose on the sprinkler system appear to be satisfactory?			✓
f. Do all exterior openings appear to be protected against freezing?			✓
2. Control Valves (see item 14)			
a. Are all sprinkler system control valves and all other valves in the appropriate open or closed position?	✓		
b. Are all control valves in the open positioned locked, sealed or equipped with a tamper switch?		✓	

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		YES	NO	N/A
3.	**Water Supplies (see item 15)**			
	a. Was a water flow test of main drain made at the sprinkler riser?	✓		
4.	**Tanks, Pumps Fire Department Connections**			
	a. Are fire pumps, gravity tanks, reservoirs and pressure tanks in good condition and properly maintained?			✓
	b. Are fire department connections in satisfactory condition, couplings free, caps in place, and check valves tight?	✓		
5.	**Wet Systems (see item 13)**			
	a. Are cold weather valves (O.S. & Y.) in the appropriate open or closed position?			✓
	b. Have antifreeze system solutions been tested?			✓
	c. Were the antifreeze test results satisfactory?			✓
6.	**Dry Systems (see items 10 to 14)**			
	a. Is the dry valve in service?	✓		
	b. Are the air pressure and priming water level in accordance with the Manufacturer's instructions?	✓		
	c. Has the operation of the air or nitrogen supply been tested? Is it in service?	✓		
	d. Were low points drained during this inspection?	✓		
	e. Did quick-opening devices operate satisfactorily?	✓		
	f. Did the dry valve trip properly during the trip pressure test?	✓		
	g. Did the heating equipment in the dry-pipe valve room operate at the time of inspection?	✓		
7.	**Special Systems – As defined in section 1-3 (see item 16)**			
	a. Did the deluge or pre-action valves operate properly during testing?			✓
	b. Did the heat-responsive devices operate during testing?			✓
	c. Did the supervisory devices operate during testing?			✓
8.	**Alarms**			
	a. Did water motor and gong test satisfactorily?	✓		
	b. Did electric alarm test satisfactorily?	✓		
	c. Did supervisory alarm service test satisfactorily?			✓
9.	**Sprinklers**			
	a. Are all sprinklers free from corrosion, loading or obstruction to spray discharge?	✓		
	b. Are sprinklers over 50 years old, thus requiring sample testing?	✓		✓
	c. Is stock of spare sprinklers available?	✓		

(PAGE 2 OF 4)

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	YES	NO	N/A
9. Sprinklers (cont.)			
d. Does the exterior condition of the sprinkler system appear to be satisfactory?	✓		
e. Temperature. Are sprinklers proper temperature ratings for their locations?	✓		
10. Date dry-pipe valve trip tested (control valve partially open). (see trip test table which follows.)			✓
11. Date dry-pipe valve trip tested (control valve fully open). (see trip test table which follows.) SEPT 30, 2001	✓		
12. Date quick-opening device tested. (see trip test table which follows.)	✓		
13. Date deluge or preaction valve tested. (see trip test table which Follows.)			✓

	DRY VALVE MAKE	DRY VALVE MODEL	DRY VALVE SERIAL NO.	Q.O.D MAKE	Q.O.D MODEL	Q.O.D SERIAL NO.
	RELIABLE	4"		RELIABLE	D	

DRY PIPE OPERATING TEST

	TIME TO TRIP THRU TEST PIPE MIN.	TIME TO TRIP THRU TEST PIPE SEC.	WATER PRESSURE PSI	AIR PRESSURE PSI	TRIP POINT AIR PRESSURE PSI	TIME WATER REACHED TEST OUTLET MIN.	TIME WATER REACHED TEST OUTLET SEC.	ALARM OPERATED PROPERLY YES	ALARM OPERATED PROPERLY NO
WITHOUT Q.O.D.									
WITH Q.O.D	13	58	28	12 PSI		1	30	✓	

If No Explain

DELUGE & PREACTION VALVES

OPERATION ☐ PNEUMATIC ☐ ELECTRIC ☐ HYDRAULIC

PIPING SUPERVISED ☐ YES ☐ NO — DETECTING MEDIA SUPERVISED ☐ YES ☐ NO

DOES VALVE OPERATE FROM THE MANUAL TRIP AND /OR REMOTE CONTROL STATIONS ☐ YES ☐ NO

IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING ☐ YES ☐ NO — IF NO, EXPLAIN

MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM YES	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM NO	DOES EACH CIRCUIT OPERATE VALVE RELEASE YES	DOES EACH CIRCUIT OPERATE VALVE RELEASE NO	MAXIMUM TIME TO OPERATE RELEASE MIN.	MAXIMUM TIME TO OPERATE RELEASE SEC.

CONTROL VALVE MAINTENANCE TABLE

14. CONTROL VALVES	NUMBER	TYPE	OPEN	SECURED	CLOSED	SIGNS	CONDITION
CITY CONTROL VALVES	2	OS&Y	✓	✓	NO	✓	GOOD
TANK CONTROL VALVES							
PUMP CONTROL VALVE							
SECTIONAL CONTROL VALVES							
SYSTEM CONTROL VALVES	1	OS&Y	✓	✓	NO	✓	GOOD
OTHER CONTROL VALVES							

15. WATER FLOW TEST AT SPRINKLER RISER

WATER SUPPLY SOURCE	CITY	TANK	PUMP
DATE SEPT 30, 2001	TEST PIPE LOCATION AT MAIN	SIZE TEST PIPE 2"	STATIC PRESSURE 58
LAST WATER FLOW TEST			RESIDUAL (flow) PRESSURE 38
THIS WATER FLOW TEST	GOOD		

Report No. 2001-348

16. HEAT RESPONSIVE DEVICES
TEST METHOD

TYPE OF EQUIPMENT
MANUFACTURER

TEST RESULTS:

VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E
VALVE NO.	A	B	C	D	E	F	VALVE NO.	A	B	C	D	E

AUXILIARY EQUIPMENT: NO. TYPE TEST RESULTS

17. EXPLAIN ANY "NO" ANSWERS AND COMMENTS. N/A
Item 1 c - STORAGE TO CLOSE TO HANGING EXTERIOR STORAGE ROOM CREATE ON LOCKER.
Item 2 b - TAMPER SWITCH WIRING DISCONNECTED FROM SWITCH OUT OF HOUSING.

18. ADJUSTMENTS OR CORRECTIONS MADE DURING THIS SINSPECTION: N/A

19. ALTHOUGH THESE COMENTS ARE NOT THE RESULT OF AN ENGINEERING REVIEW, THE FOLLOWING DESIRABLE IMPROVEMENTS ARE RECOMMENDED: NONE - OKAY

THIS IS TO CERTIFY THAT THIS AUTOMATIC SPRINKLER SYSTEM HAS BEEN INSPETED IN ACCORDANCE WITH THE STANDARDS ADOPTED BY THE WASHINGTON STATE FIRE MARSHAL AND N.F.P.A. STANDARDS 13 AND 13A.

NAME OF FIRM INLAND FIRE PROTECTION, INC.

MAILING ADDRESS 1100 AHTANUM ROAD, YAKIMA, WA 98903

NAME _____ **TITLE** _____ **DATE** _____
SIGNATURE OF FIRE OFFICIAL

NAME Joe Bowers **TITLE** MAINT. SUPERVISOR **DATE** SEPT 30, 2001
SIGNATURE OF OWNER OR REPRESENTATIVE

THIS ORIGINAL FORM SHALL BE RETURNED TO THE STATE FIRE MARSHALS OFFICE
(PAGE 4 OF 4)

Name of Facility **2000 CODE**

ID PREFIX		MET	NOT MET	N/A	REMARKS
K55	2000 EXISTING Every patient sleeping room shall have an outside window or outside door. Except for newborn nurseries and rooms intended for occupancy for less than 24 hours. 19.3.8				
	2000 NEW Every patient sleeping room shall have an outside window or outside door. The allowable sill height shall not exceed 36 inches (91 cm) above the floor. Windows are not required for recovery rooms, newborn nurseries, emergency rooms, and similar rooms intended for occupancy for less than 24 hours. Window sill height for limited care facilities shall not exceed 44 inches (112 cm) above the floor. 18.3.8				
	AUTOMATIC SPRINKLER SYSTEMS				
K56	2000 EXISTING There is an automatic sprinkler system installed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, standard approved type to provide complete coverage for all portions of the building. If partial system, indicate location of sprinklers. The systems shall be properly maintained in accordance with NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems. It shall be fully supervised. There shall be a reliable, adequate water supply for the system. Required sprinkler systems are equipped with water flow and tamper switches, which are electrically connected to the building fire alarm system. 19.3.5				
	2000 NEW There is an automatic sprinkler system installed in accordance with NFPA13, Standard for the Installation of Sprinkler Systems, with approved components, device and equipment, to provide complete coverage of all portions of the facility. The systems shall be maintained in accordance with NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems. It shall be a reliable, adequate water supply for the systems. Systems are equipped with waterflow and tamper switches, which are connected to the fire alarm system. 18.3.5.				

Name of Facility **2000 CODE**

ID PREFIX		MET	NOT MET	N/A	REMARKS
K154	Where a required automatic sprinkler system is out of service for more than 4 hours in a 24-hour period, the authority having jurisdiction shall be notified, and the building shall be evacuated or an approved fire watch system be provided for all parties left unprotected by the shutdown until the sprinkler system has been returned to service. 9.7.6.1.				
K57	A. Date sprinkler system last checked and necessary maintenance provided. ______				
	B. Show who provided the service. ______				
K58	C. Note the source of water supply for the automatic sprinkler system. ______				
	(Provide, in REMARKS, information on coverage for any non-required or partial automatic sprinkler system.)				
K60	Initiation of the required fire alarm systems shall be by manual means in accordance with 9.6.2 and by means of any required sprinkler system waterflow alarms, detection devices, or detection systems. 18.3.4.2, 19.3.4.2, 9.6.2.1				
K61	Required automatic sprinkler systems shall have valves supervised so that at least a local alarm will sound when the valves are closed. NFPA 72, 9.7.2.1, NFPA 25				
K62	Required automatic sprinkler systems are continuously maintained in reliable operating condition and are inspected and tested periodically. 18.7.6, 19.7.6, 4.6.12, NFPA 13, NFPA 25, 9.7.5				
K63	Required automatic sprinkler systems have an adequate and reliable water supply which provides continuous and automatic pressure. 9.7.1.1, NFPA 13				
K64	Portable fire extinguishers shall be provided in all health care occupancies in accordance with 9.7.4.1, NFPA 10. 18.3.5.6, 19.3.5.6				

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